February 14, 1949.

Miss Margaret Lieb,
Department of Zoology,
Columbia University,
New York 27, N.Y.

Dear Miss Lieb,

1. Your mucoid resistant is very likely the same as V_{1b}^{r}. It is of course, very difficult to score for sensitivity to this strain, and it usually seems to be resistant to all 7 phages. However, Dr. Aaron Novick, at the Institute of Radiobiology and Biophysics, U. of Chicago, tells me that he has occasionally seen a few plaques of other phages plated on this strain, and I have had a similar inconsistent experience. V_{1b}^{r} seems to be obtained most often from aged cultures, and from old plates on which acid production has occurred, e.g. on lactose-EMP. Simply cultivating it, using young transfers, in nutrient broth, rapidly restores V_{1b}^{s}, although the r form can be maintained by continuous selection of mucoid colonies. I have not been able to keep a stock culture of it, and have let it go.

2. Dr. Novick can probably add to what I have to say about the resistance patterns of K-12. In general, your data jibe with ours, except that we have recovered several V_{1a}; i.e. /1 (sensitive to T5). In addition, a V_{1c}^{r} (which may be an allel of V_{1}) has been found which is partially sensitive to T1, T1h, and T5, decreasing in that order. However, I have not seen a complex type such as /2,3,4,6,7. Can you give me any more particulars about it? If you have produced it in a biochemical mutant, could you send me a transfer?

3. T3 and T7 usually give mucoid-like cultures, but these are rather different from V_{1b}^{r}

// These have sometimes behaved inconsistently, as if they were reverting to s, but the variability may be in the phage stocks. There are a system of T7 mutants which rapidly interconvert, and Luria tells me that K-12 is <u>not</u> sensitive to T3 itself, but only to a frequent mutant which can be called T3k. However, some of the biochemical mutants, especially 679-680 and Y-10 are sensitive to T3 itself. Novick and Szilard have been working on this, and I recommendethat you correspond with them.

4. As I remember, V_6^r is specifically resistant to T6. But we no longer have our original stocks.

5. As far as nutritional correlations go, Mr. Zinder here did some rather extensive experiments last summer to see whether we could find any resistant mutants correlated with new nutritional requirements, like those for tryptophane in B/1 and for proline in other B/- . All the T1-7 phages were used, butnothing turned up. If you find anything, please let me know.

6. The recombination data for V_1 and V_6 have been published. V_{1b} is probably too unstable to be reliably useful in crosses, although by considering only those prototrophs which are still mucoid, you can get some information. V_{1a} has not been definitely located, but is probably to the left of V_1, between it and Lac_1. The other factors have not been mapped yet, although they have been used desultorily in some crosses, and found to segregate.

7. While there is no reason why you should not go ahead with further recombination studies in these strains, we have had some hints that the "standard stocks" used in crosses may carry the equivalent of chromosomal aberrations. We are starting from scratch with a new set of biochemical mutants from K-12 to try to straighten out the situation. Thesediscrepancies might affect the details of the linkage map, but nothing that can't be easily rectified.

8. Please let me know if I can be of help in any way.

Best regards,

Sincerely,

Joshua Lederberg
Assistant Professor of Genetics